

EXHIBIT # 16: ADDITIONAL DESIGN AND CONSTRUCTION CONSIDERATIONS

Additional descriptions of site-specific design and construction requirements for implementation of the Recommended Plan are listed below:

Argentine Levee Raise Design and Construction Considerations

Argentine Levee Raise: General Design and Construction Factors. In general, the following two factors will affect design and construction along several areas of the levee raise.

- Several areas along the Argentine levee were identified as Hazardous, Toxic, or Radiological Waste (HTRW) sites. A section within the main feasibility report describes HTRW considerations of the Recommended Plan. Design and construction procedures need to recognize these sites and adapt accordingly. Construction cannot normally occur on top of contaminated soil.
- The Recommended Plan for the Argentine levee raise involves no permanent impact to existing railroad tracks, but design and construction in all areas with adjacent railroad tracks requires coordination with the railroads. Trains may need to be temporarily scheduled so as to allow movement of construction equipment into and out of the construction area.

Argentine I-wall Construction. The pre-construction coordination should include careful planning sessions where the I-wall procedures are sequenced and scheduled to avoid undue delays with an open levee crown. During I-wall construction, the levee crown is removed along with any rip rap cover. The I-wall installation proceeds and then the levee crown is rebuilt as soon as practical.

Argentine Floodwall Extending East of Station 276+70. This major floodwall is adjacent to railroad tracks all the way from Sta 276+70 to Station 287+92 (about 1200 feet). The floodwalls are inverted cantilever T-walls on spread footing foundations. A stop log closure structure continues to station 288+57, crossing the multiple lines of Santa Fe Railroad track. The stoplog gap uses timber stop logs for closure. The Recommended Plan requires floodwall and stoplog replacement. All of this work requires close coordination with the railroad to prevent rail downtime. Access and available staging need careful planning due to the close proximity of the tracks. Equipment is likely to enter the area from the upstream end. Work is likely to proceed from downstream to upstream.

Argentine Floodwall Sta 251+65 to Sta 253+92 and Argentine Main Pump Station. A floodwall protecting the Argentine main pump station is located from Sta 251+65 to Sta 253+92 (about 225 feet). The Recommended Plan requires floodwall replacement. Excavation and removal of the existing floodwall begins the construction sequence. During removal, deep excavation is needed where the earthen levee currently meets the floodwall (on both sides). The primary consideration for this site is high-water contingencies (such as a stockpile of impervious material and backfilling equipment available in the event of high water). Petroleum-based (non-CERCLA) contamination is present in this area and the project estimate anticipates contaminated soil and special disposal requirements. Clean fill material is used for backfill. Handling of contaminated groundwater is not required as the groundwater table is normally below the planned excavation depth.

Argentine Strong Ave. Pump Station and Outlet Box at Station 273+41. The construction procedure for strengthening of the Strong Ave. pump station uses a steel pilaster and braced strut design for the

foundation walls, along with a thickened reinforced slab to address floor strength and station uplift concerns. A jacked-in steel pipe liner is used to strengthen the existing outlet culvert. Accurate alignment and set-up of the jacking operation is crucial. Working areas within the pump station are restricted in size and the construction schedule should anticipate some typical close quarter work..

Argentine Utility Crossings. Utilities crossing the Argentine Unit were studied to estimate the costs for relocation or removal of (functioning or abandoned) utilities, and for the real estate implications related to compensability determinations. As a general rule, pressure pipelines passing through or under the levee are generally relocated over the raised levee. An additional amount of earth cover tops off the utility lines and the resulting “mound” is sloped on each side to allow vehicular transverse. Normally these utility lines are hot-tapped thus maintaining service to customers during construction.

Argentine Unit Bridges and Roadways. The Recommended Plan does not require any bridge superstructure modifications, nor does the Recommended Plan require any road realignments. Transportation of levee raise materials may at times increase traffic along nearby roadways but this area is industrial and truck traffic is common.

The final grade and slope on the raised top-of-levee access road needs close coordination with the sponsor. The raised top-of-levee road will incur many more up-and-over utility crossings under the recommended plan. The design for these crossings points and the amount of roadway cover should allow vehicular traffic (such as passenger cars and trucks) to traverse the crossings with relative ease. The design of the top-of-levee road may need some realignment to maintain required minimum clearance under the I-635 bridge structure.

East Bottoms Missouri and Blue Confluence Area Relief Well Installation

The Recommended Plan provides for installation of a series of relief wells in the East Bottoms levee unit from approximately Station 403+00 to Station 420+00. While relief well installation is relatively standard practice, some well flow-testing during the design phase is needed to establish the expected capacity and flow characteristics for final well design.

During design phase flow-testing and during construction, it is important to avoid any unintended variance from the designated well locations. The Recommended Plan carefully avoids contaminated Solid Waste Management Unit (SWMU) sites. Adequate coordination with the adjacent industrial facilities manager is needed if fences need relocation (which may be necessary for large equipment access). The construction contract must contain adequate security coordination requirements. Construction procedures must recognize and include avoidance or protection from the power lines in the immediate area. Underground utilities clearances are needed per normal operating procedure, but problems with underground utilities conflicts are not expected. Staging area may need to be located about 2,000 feet to the west of the work area as the adjacent industrial site is secure and has no available space for staging.

Fairfax-Jersey Creek Unit, Fairfax-BPU Floodwall Modifications

The Recommended Plan for the Fairfax-BPU Floodwall (Sta 287+86 to Sta 302+32) provides for strengthening of the floodwall pile foundation. The proposed work includes extending the pile cap and adding an additional fourth row of auger-cast piles along the entire floodwall. The feasibility level pile

design uses 50-ft deep, 24" diameter auger cast piles at seven foot on center. During the design phase, a more detailed design is needed for the exact sizing of the fourth row of piles. The piles are enclosed within a new extended pile cap which is connected into the existing pile cap. A buttress is installed over each new pile to transfer load from the wall into the additional piles.

Access must consider BPU power plant operations. Prior to construction contract award, the project team must coordinate delivery routes and acceptable periods for deliveries, acceptable locations for construction trailers, general staging and storage. The location of railroad tracks (these are short haul tracks that move coal within the power plant yard) need consideration. The project estimate includes protection (or temporary removal and reinstallation) of certain tracks during construction.

The BPU work site includes a 500-foot reach along the floodwall containing numerous underground utilities including major water intake lines for the power plant. Carefully designed and constructed floodwall modifications in this utilities area are necessary to prevent disruption of plant operations. The critical nature of these utility lines require detailed utility locations efforts and clearances beyond the normal procedures. Construction management must closely and continually monitor the excavation and pile installation process within this utilities area.

An old Kansas City, Kansas waterworks pump station with potentially historic connotations needs special attention. The recommended floodwall modifications are within 30 to 50 feet of the old pump station. The Recommended Plan leaves the visible pump station building intact. However, to reduce the potential for underseepage failure, the pump station basement is filled with sand or flow-able fill material. The foundation slab is perforated and all (abandoned) pumping equipment is removed. Pipes connected to the old pump station are grouted full.

Fairfax-Jersey Creek Unit, Jersey Creek Sheetpile Wall Reconstruction

This sheetpile retaining wall structure is located between Sta 15+70 to Sta 29+98 and provides stability for the foreshore bank situated below the existing levee and I-wall. The recommend plan includes reconstruction of this sheetpile wall due to general age-related degradation. Reconstruction uses a driven open-cell sheet pile system constructed landside of the existing sheetpile wall. It is expected that the construction of the new wall will require floating plant (barge with crane) positioned in the Missouri River. Landside access to the area is available and should well complement the floating plant installation.

The design and construction of the sheetpile wall should aim to leave as much of the current wall in-place as possible. This involves cutting through, pulling and otherwise removing minimum size sections of the existing wall so as to form the open gaps necessary to drive the new sheetpile tiebacks in the open-cell configuration. Design and preconstruction planning must adequately consider the exact manner and locations where the old sections are to be removed.

The design must consider the manner in which the new sheetpile wall will terminate adjacent to each end of the wharf area (the wharf area reconstruction is not part of the Federal construction project as it is planned for local accomplishment). It may best to design the new sheetpile wall cells to terminate independently of the wharf as the schedule for local wharf reconstruction cannot be directed by the Corps of Engineers.

North Kansas City Unit - Harlem Area Buried Collector (Sta 210+00 to Sta 240+00)

A sewage force main crosses along and near the landward levee toe in the Harlem area. The sewer main is not scheduled for relocation. Precautions are necessary to prevent inadvertent damage or dislocation of the main. Both the sewer main and a row of nearby power poles may require temporary bracing. The project coordination team should select the construction staging area with consideration of limiting traffic impacts to the nearby businesses and residences.

North Kansas City Unit - National Starch Area Relief Well System (Sta 259+00 to Sta 271+00).

The Recommended Plan provides for a relief well system and a small pump station to control underseepage and reduce uplift at the landward toe of the existing levee in the National Starch Area. Access is via top-of-levee road or through industrial site. Coordination with the industrial facility manager for appropriate security measures is necessary at this work site. This area is somewhat remote from paved roads and the trafficability of, and damage to, the top-of-levee access road should be monitored. It may be possible to locate the construction staging area within the adjacent industrial site if appropriate permission and temporary easements are granted.

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